

A new species of marsupiate Antarctic echinoid: *Amphipneustes davidi* (Echinodermata: Spatangoida: Schizasteridae)

Céline Madon-Senez

Centre des Sciences de la Terre, UMR CNRS 5561, 6 bld Gabriel, 21000 Dijon, France

Abstract.—The Recent brooding species of the genus *Amphipneustes* (Schizasteridae) live in the subantarctic and antarctic regions. A new brooding species, *Amphipneustes davidi*, differs from its congeners in three ways: the periproct, located at the ambital posterior region of the test, is conspicuous from the apical side; the posterior ambulacral avenues of the oral side are strongly directed laterally; peculiar huge bidentate pedicellariae show an unusual spatulate shape.

Résumé.—Les espèces incubantes actuelles du genre *Amphipneustes* (Schizasteridae) sont endémiques aux régions antarctique et subantarctique. Une nouvelle espèce marsupiale, *Amphipneustes davidi*, se distingue des autres espèces du genre par trois caractères: le périprocte, en position ambitale, est visible en vue apicale; face orale, les ambulacres postérieurs s'écartent de l'axe de symétrie antéro-postérieur, pour se diriger vers les régions latérales de l'oursin; des pélicellaires bidentés présentent une forme spatulée inhabituelle chez les Schizasteridae incubants.

The genus *Amphipneustes* has a subantarctic and antarctic distribution (Pawson 1969). In addition to the type species *Amphipneustes lorioli* Koehler, 1901, nine species have been described: *A. koehleri* Mortensen, 1905, *A. mortenseni* Koehler, 1912, *A. rostratus* (Koehler, 1926), *A. tumescens* (Koehler, 1926), *A. marsupialis* (Koehler, 1926), *A. brevisternalis* (Koehler, 1926), *A. similis* Mortensen, 1936, *A. bifidus*, Mortensen, 1950 and *A. mironovi* Markov, 1991. Eleven specimens dredged during the 1959–1960 and 1964–1965 Belgian and Dutch Antarctic Expeditions share the characteristics of the genus *Amphipneustes* but differ from the previously known species in several ways.

Materials and Methods

The materiel was collected during the 1959–1960 and 1964–1965 Belgian and Dutch Expeditions in Antarctic (Enderby quadrant). The specimens are housed in the

Collection of the Museum National d'Histoire Naturelle (MNHN) of Paris, France. Classification follows Fischer (1966) and nomenclature abides by Lovén's law (1874). Drawings were done with a camera lucida.

Systematics

Order Spatangoida Claus, 1876
Family Schizasteridae Lambert, 1905
Genus *Amphipneustes* Koehler, 1900

Species of the genus *Amphipneustes* share a comparable morphology: the outline is ovoid, with circular or attenuated posterior end. The profile is rounded or conical. In females, the petals are transformed into brooding pouches in which the embryos develop into juveniles. The adult specimens totally lack fascioles (Mortensen 1951). The periproct is located on a small posterior surface vertically or obliquely truncated toward the oral side, so that it is invisible from the apical side. Different types of ped-

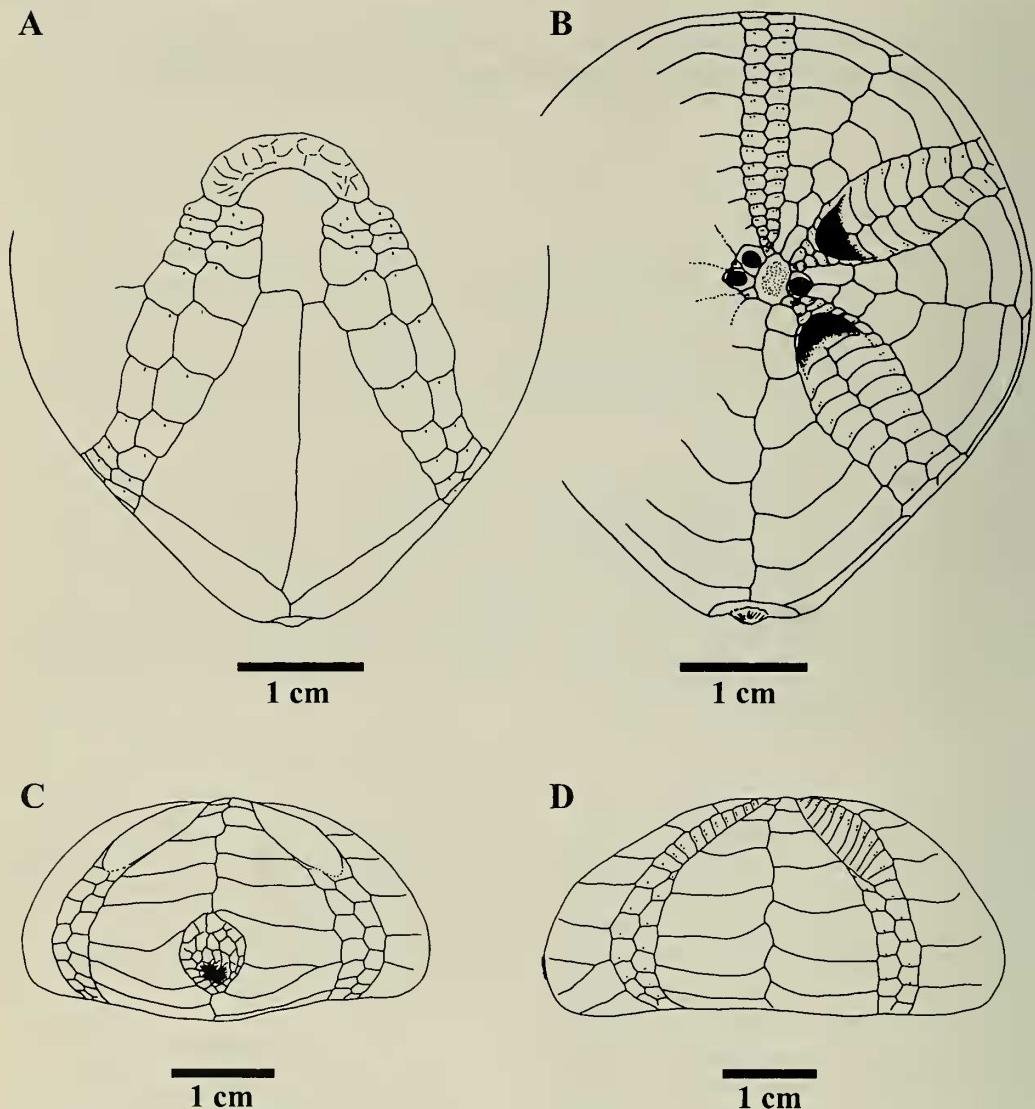


Fig. 1. Holotype MNHN EcEh 9362. A. Oral side; B. Apical side; C. Posterior view; D. Lateral view.

icellariae exist in the genus: dentate, rostrate and globiferous forms are frequently encountered.

Amphipneustes davidi, new species
Figs. 1–3

Holotype.—MNHN EcEh 9362, female, Sta. 223, 1964–1965 expedition, Glacier Bay ($70^{\circ}13'2''S$, $23^{\circ}55'1''E$), 207 m.

Paratypes.—MNHN EcEh 9363, 1 female, and MNHN EcEh 9364, 1 male,

(from $70^{\circ}19'S$, $24^{\circ}12'E$ to $70^{\circ}17'S$, $24^{\circ}06'E$), 1959–1960 exp., Iris Mission; MNHN EcEh 9365–67, 3 males, Sta. 223 ($70^{\circ}13'2''S$, $23^{\circ}55'1''E$), MNHN EcEh 9368, 1 female, Sta. 219 ($70^{\circ}18'5''S$, $23^{\circ}58'0''E$) and MNHN EcEh 9369, 1 female, Sta. 223 ($70^{\circ}13'2''S$, $23^{\circ}55'1''E$), 1964–1965 exp., Glacier Bay, 216 and 207 m.

Additional material examined.—MNHN EcEh 9370–72, 3 broken males, Sta. 223, 1964–1965 expedition, Glacier Bay, 207 m.

Etymology.—The new species is named

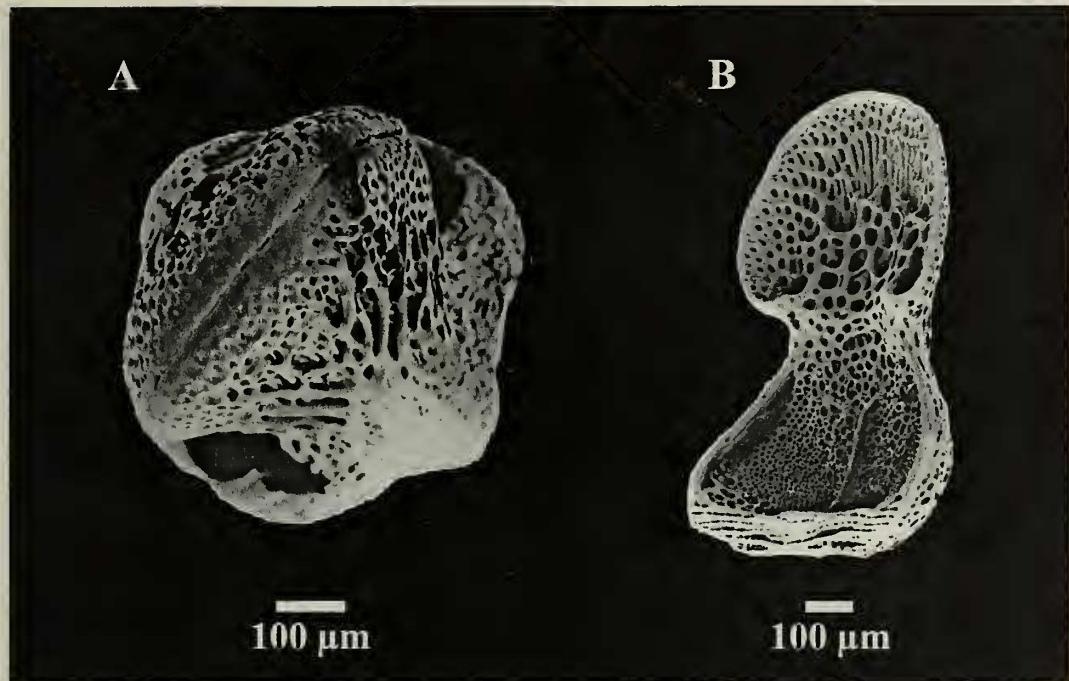


Fig. 2. Bidentate pedicellariae. A. Head with two jaws; B. Single jaw.

after my Ph.D. supervisor Dr. Bruno David (Dijon, France).

Diagnosis.—Test elongated, of medium size (from 32.6 to 56.4 mm), attenuated posteriorly and subcircular anteriorly. Periproct on the obliquely truncated posterior region, visible from the apical side. Triangular shape of the sternal plates strongly related to the unusual lateral direction of the oral posterior ambulacral avenues. Large bidentate pedicellaria with peculiar spatulate heads superficially resemble duck's beaks.

Description of holotype.—Female, total length 56.4 mm and total width 46.7 mm (Fig. 1). Test low (22.5 mm), cleaned on the right region, and covered by spines and pedicellariae on the left region. Anterior part of the test without notch in ambulacrum III; V-shaped posteriorly. Subcentral ethmolytic apical system with 3 genital pores (in ambulacra I, III and IV). Petals depressed into brooding marsupia, containing about 10 juveniles at different stages of development. Posterior region of the test

truncated toward the apical side; periproct situated in the lower part of this region. Large reniform peristome in the anterior region of the test; partially covered by a prominent labrum which reaches the 4th adjacent ambulacral plates. Triangular sternal plates; ambulacra I and V directed towards the lateral sides of the test. Primary tubercles scattered on the apical side, but close together in the ambitus region, on the sternal plates and near the periproct.

Unusual bidentate pedicellariae (Fig. 2) scattered over the apical side (near and inside the brooding pouches), the oral side (I and V ambulacra and around the peristome) and the ambitus; no neck or reduced neck (length equivalent to $\frac{1}{2}$ length of the jaw); length of the blade equal to the length of the basal part of the jaw; minute apophysis in the basal part of the jaw. Small rostrate pedicellariae (Campbell & Jensen 1993) with 2 jaws and reduced neck. Globiferous and tridentate pedicellariae were not found.

Description of paratypes.—Test flattened, posteriorly V-shape (Fig. 3). Female

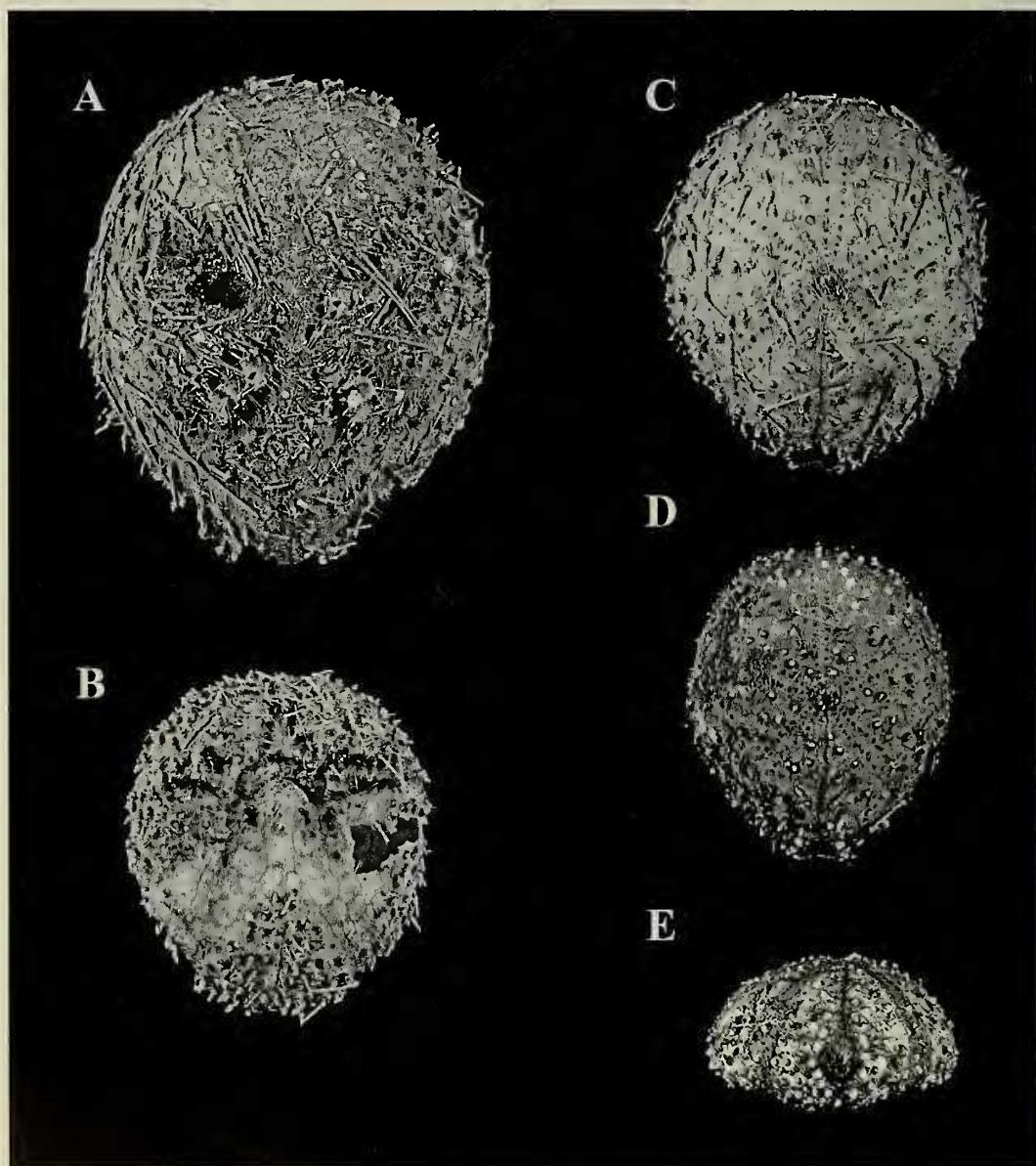


Fig. 3. Photographs of tests. A. Apical side of a female (MNHN EcEh 9368) with juveniles; B. Oral side of a young male specimen (MNHN EcEh 9366); C. Apical side of a young male specimen (MNHN EcEh 9365); D and E. Apical and posterior views of a young specimen (MNHN EcEh 9367).

(MNHN EcEh 9368) with a total sum of 16 juveniles (flush with the test) and a few yolk eggs (at the bottom of the brooding pouches) distributed in ambulacra I, II, IV and V. Male (MNHN EcEh 9366) with posterior surface almost vertically truncated; periproct invisible from the oral side.

Description of additional material.—Three broken males with both bidentate pedicellariae and rostrate pedicellariae with 2 jaws. Large primary spines (TL: 8 mm).

Distribution.—Antarctica, Glacier Bay, in depths ca. 207–216 m (Capart & Closset 1964).

Discussion

These specimens, dredged during Belgian and Dutch Antarctic expeditions, remained unknown for 30 years in the Muséum National d'Histoire Naturelle of Paris, France. The three main characteristics (position of the periproct, peculiar bidentate pedicellariae and direction of ambulacra I and V) are sufficiently unusual to support the erection of a new species.

Two morphological features led to some confusion with the antarctic brooding species *Brachysternaster chesheri* (Larraín, 1985). The two species are highly characteristic in the weakness of the oral side, which is somewhat concave and frequently broken; the posterior ambulacral avenues are strongly directed towards the lateral region of the test, so that the shape of the sternal plates is triangular. The species differ in the architecture of the plastron -discontinuous within *Brachysternaster* (Larraín, 1985) and continuous within *Amphipneustes* (Mortensen, 1951, Madon-Senez, 1999) and the position of the periproct, supramarginal to marginal within *A. davidi*, marginal to inframarginal within the genus *Amphipneustes* (Koehler, 1926) and strictly inframarginal within *Brachysternaster chesheri* (Larraín, 1985).

The huge bidentate pedicellariae, visible to the naked eye, are unknown among other brooding genera of Schizasteridae. The shape and the size of their jaws (TL: 1 mm) are highly characteristic.

Acknowledgments

The author thanks N. Ameziane (MNHN, Paris) for authorizing the loan of material. Special thanks to B. David (Centre National de la Recherche Scientifique, Dijon), R. Mooi (California Academy of Sciences, San Francisco) for their kind comments and to T. Choné, S. Dousset and P. Amiotte-Suchet (Centre des Sciences de la Terre, Dijon) for their technical assistance. Photographs of the tests are by the author. The manuscript benefited greatly from the com-

ments of D. Pawson, J. Pearse and one anonymous referee. Special thanks to the Editor and the Associate Editor.

Literature Cited

- Capart, J. J., & F. Closset. 1964. Expéditions Antarctiques Belges. Mission IRIS 1960. Rapport de la section océanographique.—Bulletin de l'Institut Royal des Sciences Naturelles de Belgique 40:1–47.
- Campbell, A. C., & M. Jensen. 1993. Rostrate pedicellariae: A morphologically distinct form of echinoid test appendage.—Journal of Morphology 218:237–247.
- Claus, C. F. W. 1876. Grundzüge der Zoologie. N. G. Elwert'sche Universitäts-Buchhandlung, Marburg and Leipzig, 3rd edition, 1254 pp.
- Fischer, A. G. 1966. Spatangoids. Pp. 543–640 in R. C. Moore, ed., Treatise on invertebrate paleontology. Echinodermata 3 (U), vol. 1–2. Geological Society of America, University of Kansas Press.
- Koehler, R. 1900. Note préliminaire sur les Echinides et les Ophiures de l'Expédition antarctique belge.—Bulletin de l'Académie Royale de Belgique 38:814–820.
- . 1901. Echinides et ophiures. Expédition Antarctique Belge. Rapports Scientifiques de Zoologie: 1–42, 8 pls.
- . 1912. Echinoderms. Astéries, ophiures et échinides. Deuxième Expédition Antarctique Française (1908–1910). Sciences Naturelles: Documents Scientifiques. Masson, eds, Paris, 270 pp.
- . 1926. Australasian Antarctic Expedition, 1911–1914. Echinodermata, Echinoidea. Scientific Reports. Séries C, Zoology & Botany, vol. 8 (3), 134 pp.
- Lambert, J. 1905. In Doncieux. Catalogue descriptif des Fossiles Nummulitiques de l'Aude et de l'Hérault.—Annales de l'Université de Lyon 17:154.
- Larraín, A. P. 1985. *Brachysternaster*, new genus, and *Brachysternaster chesheri*, new species of antarctic echinoid (Spatangoida, Schizasteridae).—Polar Biology 4:121–124.
- Lovén, S. 1874. Etudes sur les Echinoïdées. Akademiens Handlingar, Stockholm, Bandet 11:1–91.
- Madon-Senez, C. 1999. Plate pattern of Echinoids tests: Architectural extensions of the labrum and of the sternal plates in Recent Antarctic Schizasterids (Spatangoida). Pp. 321–325 in M. Daniela Candia Carnevali, ed., 5th European Conference on Echinoderms (Echinoderm Research 1998). Balkema, Rotterdam, Netherlands.
- Markov, A. V. 1991. The most deep-sea representative

- of the family Schizasteridae (Echinoidea).—
Zoologeski Zhurnal 70:153-155.
- Mortensen, T. 1905. Some new species of Echinoidea.
Videnskabelige meddelelser fra den Naturhistoriske Forening i Kjøbenhavn: 241-243.
- . 1936. Echinoidea and Ophiuroidea.—Discovery reports: 224-234, pls. 3-4.
- . 1950. British Australian New Zealand Antarctic Research Expedition, 1929-1931, Echi-
noidea.—BANZAR. Expedition Reports 4:287-310, pls. 4-9.
- . 1951. A monograph of the Echinoidea. Spatangoida. C. A. Reitzel, ed., Copenhagen, vol. 2, 593 pp.
- Pawson, D. L. 1969. Echinoidea. Pp. 38-41 in V. C. Bushnell & J. W. Hedgpeth, eds., Antarctic map folio series, Folio 11. American Geographical Society, New York.